



# MAGAZINE

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FRONT COVER: *The ocotillo plant, growing in the Californian Desert, photographed by F. Baranyovits*

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# I.C.I.'s New Titanium Process—I

By R. B. Mooney and J. J. Gray (General Chemicals Division)

I.C.I. has a twofold interest in the remarkable new metal titanium. Raw titanium is produced by the General Chemicals Division, whose work in developing a process and putting it into large-scale production is described below. Their Metals Division, who have evolved processes for melting and fabricating it which will be described in our next issue.

THE 1500-ton-a-year titanium plant that started up at Wilton this summer marks the successful completion of six years of research by General Chemicals Division on the production of this important new metal.

Titanium is a metal with certain outstanding characteristics. Silvery in appearance like stainless steel, it possesses the strength and stiffness of stainless steel, while it is little more than half as heavy. In this respect it also surpasses aluminium. In addition it has superlative resistance to weather and sea water. This combination of properties makes titanium particularly attractive for the construction of aircraft, both military and commercial.

For instance, it will be used to make compressor blades for jet engines, and thin titanium sheet will be used as a heat-resisting skin for supersonic planes. Many other uses for titanium are being tried where a light but very strong metal is required.

Most people think of General Chemicals Division as a producer of sulphuric acid, chlorine, caustic soda and other old-established chemicals, and it may seem surprising that we should be making large tonnages of a metal like titanium that was a laboratory curiosity only a few years ago. But the Division knows a great deal about the production of unusual metals. It turns out thousands of tons of sodium every year and, on a smaller scale, makes the cerium alloy which is used for lighter flints.

One of the big wartime successes of the Research Department at Widnes was their process for making large quantities of pure uranium metal for atomic

energy uses. So when I.C.I. decided to go in for titanium production in a big way it was quite natural for General Chemicals Division to take over the job of extracting the metal from its compounds, while the subsequent operations of melting, forging and rolling

are carried out by Metals Division. The Wilton plant makes very pure titanium in the form of granules, which go to Kynoch Works for melting into ingots and further working up into the sheet, bar, tube and wire that are wanted by the aircraft firms.

Titanium was discovered in 1790 in black sands found near Falmouth. Its ores are now known to be very widespread, and titanium is the fourth most abundant constructional metal on the earth.

Unlike, say, iron, the metal could not be made by smelting with carbon, but it was isolated several times before 1925, usually by converting the ore, which is an oxide of titanium, to the tetrachloride and reacting this with sodium in a steel bomb. These titanium samples, however, were all brittle and quite useless for constructional purposes, owing to the fact that they contained impurities such as oxygen, nitrogen and carbon, which destroy the ductility of the metal.

It was not until 1925 that the potential usefulness of titanium was realised. In that year Van Arkel and De Boer working in Holland prepared highly pure titanium by decomposing titanium tetraiodide on an electrically heated filament. Although the work of



THE TITANIUM PLANT AT BAIN WORKS, WILTON. The large tanks on the right store the liquid titanium tetrachloride, which is the raw material from which titanium is made. The cylinders on the racks in the centre contain argon, which is the inert gas under which titanium is manufactured to prevent oxidation from the air.





THE DISTILLATION PLANT at Bain Works, Wilton, in which titanium tetrachloride, the raw material for titanium, is purified

Van Arkel disclosed the latent possibilities in titanium, the method he employed was too expensive for large commercial production, and a further period of twenty-one years elapsed before commercial quantities of ductile titanium were produced by the U.S. Bureau of Mines.

The process employed was based on the work of W. J. Kroll (from about 1934 onwards), and involved the reaction of titanium tetrachloride with the metal magnesium. This yielded a mixture of titanium sponge and magnesium chloride. Separation of the magnesium chloride was effected in the first place by melting it and draining it from the sponge, and was completed by distilling it off at a high temperature under vacuum. Other American concerns soon entered the field, and American production has grown steadily, reaching 5000 tons of sponge in 1954. All of this has been made by modifications of the Kroll

process. Japan has also produced substantial quantities of Kroll titanium in the last year or so.

I.C.I. interest in titanium began in 1949, when General Chemicals Division built a Kroll plant with a capacity of 12 tons per year to enable Metals Division to gain experience in melting and fabricating the metal and to supply development quantities of titanium to potential customers.

The 12-ton plant came into production in the Research Department early in 1951. Three years later a larger plant started up in Gaskell-Marsh Works, also using the magnesium process. This plant was designed to make 100 tons per year to meet the increasing demands of Metals Division. Both plants had their teething troubles but soon settled down to produce good-quality metal.

While we were building the two Kroll plants we were also trying to develop a better and cheaper

process which could be used if still larger production plants were called for. Many processes were studied on paper and in the laboratory, and many were turned down. We finally decided that the use of sodium instead of magnesium to reduce titanium tetrachloride would lower production costs if the process were practicable. But on the latter point grave doubts existed in many quarters. Papers published in the technical press, particularly by W. J. Kroll, discounted for a number of technical reasons the possibility of using sodium in a reactor suitable for commercial production, while the handling of sodium in quantity can present nasty problems owing to its readiness to catch fire and its explosive reaction with water.

### *Forebodings Dispelled*

General Chemicals Division knew all about these risks, but it had had years of experience in the safe handling of large quantities of sodium. So in spite of the forebodings of the experts about the sodium process, experiments were started at Widnes Laboratory on a 7 lb. scale at the beginning of 1951. It soon became apparent that the technical objections to sodium had been exaggerated and that the reaction could be carried out satisfactorily, at least on this small scale. Moreover, the physical and chemical characteristics of the resulting mixture of sodium chloride and titanium allowed for the mixture being separated by relatively cheap processes.

Similar methods cannot be employed very satisfactorily on Kroll titanium, and hence, in this respect, the sodium route has considerable advantage. The titanium produced in the early experiments did not reach the required standard of ductility, chiefly owing to the difficulty of excluding oxygen at various stages. After a year of effort, however, the sources of contamination were tracked down, and by spring 1952 titanium was being produced which satisfied the standard required by Metals Division at that time.

### *Pilot Plant Trials*

The next step was to build a larger reactor. This was a unit with a batch size of 100 lb. of titanium, and came into operation in mid 1952. Semi-technical working-up plant was not provided at this stage, the products being treated in improvised laboratory apparatus. This reactor soon confirmed the success of the smaller one.

In August 1952 it became known that a large commercial plant was likely to be built, and that a decision on the process to be used would have to be made within a few months. Two gaps in the information still remained and would have to be filled before the claims of the sodium process could be pressed to the Board. Design data for the working-up plant was necessary; and, more important, the 100 lb. reactor was still too small for commercial use, while the behaviour of a commercial reactor could not be predicted from the results already obtained.

### *Extreme Urgency*

As a matter of extreme urgency the design and construction of a 900 lb. reactor was begun, this being deemed big enough for commercial use and small enough to be built and tried out in the space and time available. The furnace was designed and constructed by the Heat Treatment Section of the Technical Service Department at Oldbury, who were asked to throw up any old thing that would last for three batches. (In the event it served for 100 batches and was good for more when rebuilt.)

By dint of great efforts by the engineering people, the reactor was completed and made its first batch shortly before the end of the year, while the treatment plant was commissioned at the same time. So when Sir Alexander Fleck visited the Research Department early in 1953, three batches had been made successfully in the 900 lb. reactor; the treatment plant had worked, though with a good deal of creaking; and Metals Division had reported favourably on the metallurgical properties of sodium-reduced titanium. The Research Department felt justified in recommending to the Division Board that the large plant should be based on the sodium process, and this recommendation was accepted.

### *The Fun Begins*

If the reader should conclude that this is virtually the end of the story, let us dispel that illusion without delay. So far progress had been made almost without setbacks, though latterly against a background of urgency. Now, however, the fun really began, and against a much sterner background of urgency, for the new full-scale plant was scheduled to begin operation within two years of the start of design.

In the first place, the success of the first three reactions must be attributed to beginners' luck, for soon afterwards distressing failures occurred which

(Continued on page 11)



# THE DIE-MAKER

**W**HAT is a die? At different factories they will give you different answers to this question. But to the Paper Goods Manufacturing Co. at Sutton a die means only one thing: a piece of twelve-ply wood on which is traced in thin lines of metal the intricate design of a cardboard carton.

It is this die that produces the cuts, creases and perforations that enable a flat sheet of cardboard to be transformed into something shapely, strong and rigid.

To understand the die-maker's job, though, you really need to go back to the beginning of the cardboard carton story, when rolls of paper and board enter the Paper Goods factory. For some cartons—notably soda crystal cartons for Alkali Division—paper is glued to board with a special adhesive, but for most jobs sheets of board already "lined" with paper are used. These are fed into printing machines, which print the design of as many as fifteen cartons at a time on a sheet.

Next the sheets are fed into another machine. It is not unlike a printing machine, but on the bed of it, instead of type, lies our friend the cutting and creasing die. A cylinder rolls the sheet of board over the die with just the right amount of pressure, picks it up again and delivers it to a stack. The outlines of the cartons have been neatly cut round; the crease marks and perforations are ready for the time when the cartons will be erected.

I was taken to see Tom Horan, a young die-maker who has just finished his apprenticeship and will soon be doing his national service. When I said I would like to see him make a die, Tom said: "All right—if you don't mind staying here for three days. That's how long it takes."

However, Tom arranged a special demonstration. He took a sheet of plywood and showed how he marked it up from the drawings given him. "A fifteen-up die—that's for cutting and creasing a sheet with fifteen cartons printed on it—may take me a whole day to mark up," he said.

He took the wood to a jig-saw and demonstrated how he cut neatly down the lines he had marked out. That may take him another day. It is more difficult than it sounds, because Tom cannot saw blithely along all the

time—every few inches he must leave "bridges" of wood that will serve to hold the die together.

"When I've finished cutting," said Tom, "there's the metalling." He showed me his store of metal rules: some razor-sharp, for cutting; others with serrated edges, for perforating; and others blunt, for creasing. Tom fits lengths of the appropriate rule into the saw-cuts on the die. The outline of each carton, of course, is in cutting rule. There will probably be other cuts to form flaps, perforations to form tucks, and creases all over the place, and each cut and crease is represented on the die by a carefully inserted length of rule.

There was no guesswork about it, Tom said. Five-thousandths of an inch was the tolerance he was allowed. Unnecessary? Not when you remember that these cartons were to be erected and filled by automatic machines. These machines have no taste for discrepancies: every carton must be perfect and every one the same.

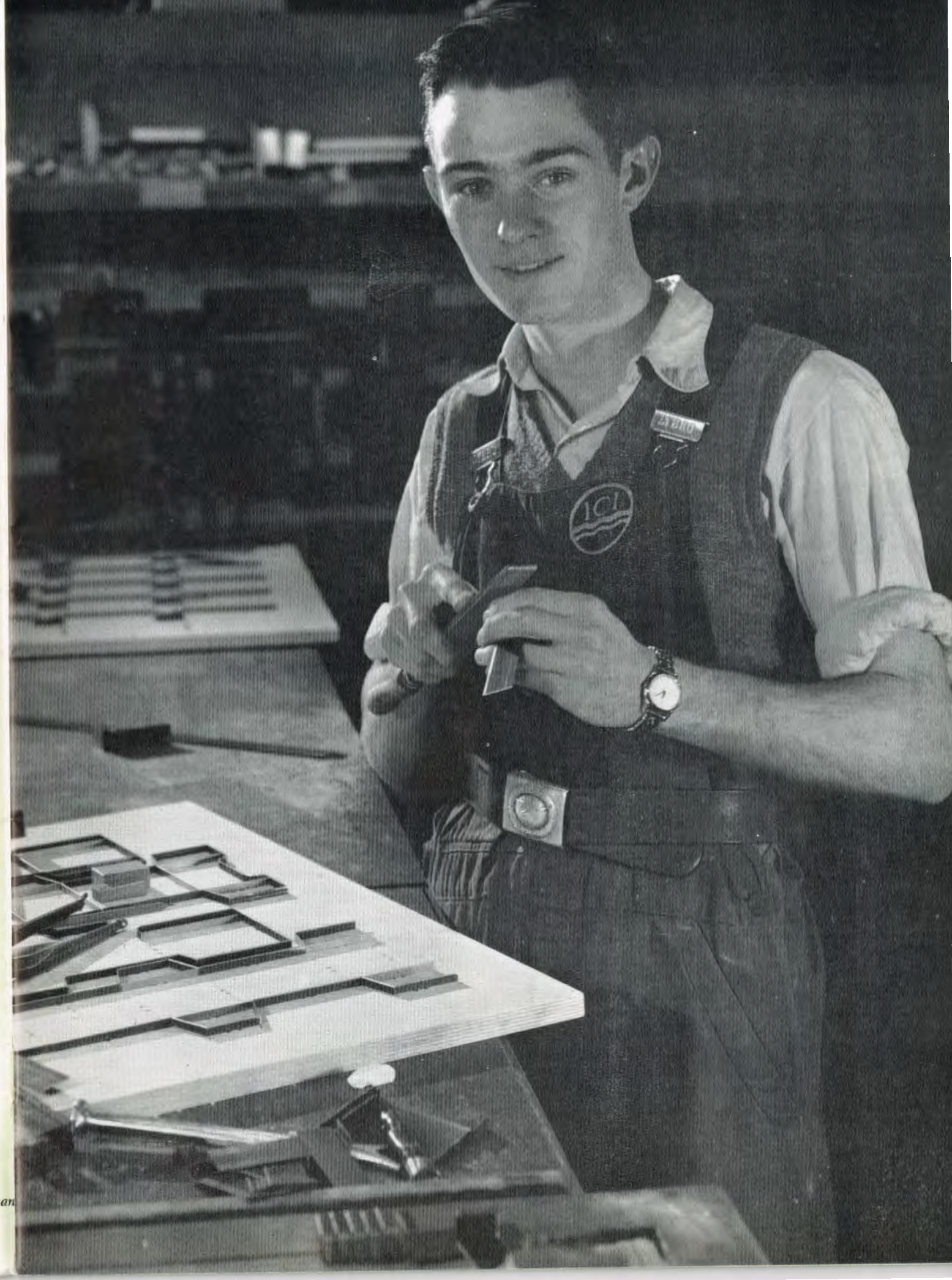
When the die has been metallated there is only one more job to do on it. All the cutting metal is hedged about with little strips of rubber or cork, which force the sheet of board away from the die after it has been cut and the pressure released.

When the boards have left the cutting and creasing machine they go in big bundles to tables, where the surplus board from around the cut carton shapes is stripped off. This is one of the few jobs that must still be done by hand—or rather by hammer, for that is what the strippers use. The stripped cartons then go to glueing machines, where one side is glued to the other.

Although Paper Goods is an I.C.I. subsidiary and part of Alkali Division, you will find many "outside" jobs passing through its machines: cartons for dried fruit, powdered milk and toothpaste tubes, for instance; and quite often Tom Horan has to turn his hand to the intricate dies needed for fancy display cartons. But there is always a steady flow of cartons for Pharmaceuticals and Salt Divisions, and two of the most modern machines are devoted entirely to producing soda crystal cartons for Alkali Division—a million and a half of them a week if necessary.

M.J.D.

Tom Horan





# Information Notes

## A VISIT TO MOSCOW

By S. P. Leigh (Overseas Controller)

*Three months ago a small I.C.I. trade mission visited Moscow. They found prospects for doing business with Russia encouraging and the people friendly. The head of the mission here describes what he saw.*

*Photographs by the author*

THE idea of an I.C.I. trade mission to Moscow had been in our minds for the past two years. Eighteen months ago, when the chance of being given a business visa to go to Soviet Russia seemed rather slender, I asked the then head of the Soviet trade delegation in London if I could be granted a permit to go and shoot a bear, that being possibly the only way of seeing something of the country. The immediate response was gratifyingly cordial—indeed, there was only one small formality which might stand in the way: I should have to state the name of the bear!

As I did not know any bears personally, this was rather a setback; but it was not altogether unpromising, as it at least showed that the Russians had a sense of humour rather like our own, which is always a good start for getting to understand people. At any rate, the mutual understanding of our wants and intentions progressed gradually to the point when the present head of the trade delegation willingly put to Moscow our proposal for a visit, which in due course was agreed.

### Better Trade Prospects

Before the visit took place there had been some evidence that the Russians were showing an increasing interest in the supply of products and know-how from this country. Several senior Soviet officials had visited the United Kingdom on matters of specific interest, and other visits were being discussed on the initiative of Moscow. It seemed, therefore, that the chosen date of our visit might well be opportune, especially as by a little pressure we had got permission to go in October instead of November, when their six-monthly buying programme would be ready and Moscow would be full of our competitors.

In fact this proved to be so, since, after brief preliminaries, we were given ample opportunities for intensive discussions about the uses of our products with many

highly qualified technicians in charge of the factories which might use them. This applied particularly to dyestuffs and pigments, while in the medical field discussions took place with leading neurologists and other senior professional men.

The proof of the pudding still awaits the eating. This is not surprising in view of the shortness of our visit—only eight days in Moscow—and the novelty of many of the products offered, but, judging by the keen interest shown in many of our lines, I personally shall be surprised if in the near future the Soviet Government do not fulfil their assurances to us by sending at least substantial trial orders through their trade delegation in London.

I hope readers will be interested in this brief summary of the business background of our trip, but from the vast number of questions we have been asked since we came back I believe they may also be interested in a few personal impressions of the people and the country. They can, of course, be no more than impressions, since as far as Russia was concerned our whole trip consisted of two days on a Russian boat from Stockholm to Leningrad, half a day in Leningrad itself, a night on a Russian sleeper, eight days in Moscow and three hours' flying back to Helsinki in a Russian plane.

### Friendly People

First of all the people, and mainly the people in the streets. In general they appeared busy and contented, with a casually friendly attitude both to each other and to foreigners. We saw no obvious signs of malnutrition or destitution, neither did we see any beggars.

On the other hand, there was little gaiety, so that an occasional laughing group was noticeable. Clothing was drab in the extreme, though apparently adequate at least for the comparatively mild weather we experienced during our visit. In fact the scene was rather reminiscent of the



Red Square, more than thrice the size of any London square. On right are stands from which Soviet leaders and foreign diplomats watch parades. Just beyond is mausoleum with embalmed bodies of Lenin and Stalin. On left is big departmental store, GUM.



Queueing to enter Stalin-Lenin mausoleum. Castellated wall runs round Kremlin, enclosing cathedrals, museums, offices.



The Dynamo Stadium in Moscow on the occasion of the drawn match between France and Russia last October



austerity days during the war over here but without the sparkle of excitement inspired by danger which so often broke through in those days to help us along. During the whole of our time in Moscow I did not once see a girl or woman who was in the smallest degree dressed to attract male admiration or who was even trying to do so without artificial aids.

### *Planned Building*

The streets and buildings themselves in Moscow give rather a muddled impression. Very handsome new buildings, though rather stereotyped in style, have been erected or are going up in many places among much earlier and shabbier constructions. Old Moscow apparently just grew like London, but modern Moscow is being deliberately planned so that each particular block has all the essentials for city existence, that is, doctors, conference halls, schools, shops, etc.

There are exceptions to this rule, particularly around the Kremlin, with the vast Red Square on one side and the wide Moscow River and public gardens bounding it on the others.

In general the streets are immensely wide, so that by comparison Oxford Street is almost a lane. One result of this is that it is dangerous to cross except at the pedestrian crossings, which are mainly police controlled. The volume of motor traffic is heavy, but the standard of driving seemed very good and we did not see even a minor accident during our stay. This is probably due to two reasons, first that the official driving test is very severe and second that there is a great scarcity of service garages, so that an accident may put a car out of use for some time.

For all I know there may also be severe penalties for the infringement of traffic regulations. The ordinary police are very numerous, and so are the grey-uniformed M.V.D. police, successors of the old N.K.V.D.; but, numbers apart, there was no other shadow of evidence of the police state. Indeed, the London policeman will have to look to his laurels if he is going to compete with the grave courtesy with which the police in Moscow treat both visitors and their own inhabitants. This only wears a bit thin if you try to cross the road at the wrong place.

### *Crowded Shops*

The shops, all government owned or controlled, are comparatively few in number for so large a population and are always crowded throughout the day and up to a late hour of the evening. Most of them are fairly small, but Gum (on the Red Square) consists of one long glazed arcade of two storeys, perhaps 200 yards long, with separate shops or alcoves on both sides throughout its length, in which you can buy almost any conceivable article produced in Russia. Standardisation of products was noticeable everywhere, although we were told that

there is now much greater variety in consumer goods than there was a short time ago.

The question of prices is interesting. The foreign exchange value of the rouble at 11·2 to the pound is about 1s. 9½d., but we calculated that its internal purchasing power, though this varied between different products, was about 6d. This sounds as though the cost of living must be immensely high, but in fact wages are largely adjusted to the internal value. Thus an article priced at, say, 10 Rs., which to the British visitor appears to be excessively overvalued at the equivalent of, say, 18s. or 19s., appears to the Soviet citizen to be still rather dear but not unduly so at the equivalent of 5s.

### *Low Wage Rates*

Standard rates of wages on this same basis are rather low. The unskilled worker in Moscow gets about 650 Rs. a month, while a taximan gets about 800 Rs. Neither of these rates gives enough income to raise a family, and therefore some other member, usually the wife, goes out to work. Most of the menial jobs in the city, such as street cleaning, are done by women. Similarly low basic rates of wages apply in industry, but here there is a highly elaborate system of bonuses for merit—merit usually meaning increased production—which are granted both collectively and to individuals in factories which exceed their rated capacity or norm. In this way a strong incentive element is introduced, and a fair proportion of the people have something above the income required to meet their basic needs.

### *Impressions of the Kremlin*

In Moscow we visited the Kremlin with its many golden-domed cathedrals (now deconsecrated), and its museum with a remarkably cumbersome coach presented by Queen Elizabeth I to the Czar Boris Godunov; the tomb of Lenin and Stalin, not really much more impressive to foreigners than Mme. Tussaud's, even though the bodies were real, but which draws an endless queue of sightseers; a football match in the Dynamo Stadium between Russia and France which ended in an unexpected draw most satisfactory to France, under the guidance of a well-known English referee; a superb production of the "Swan Lake" ballet; Moscow University with 20,000 students, 6000 of whom are resident, housed in a huge series of buildings on the Lenin Hills overlooking Moscow, so spaciouly planned as to remind one of New Delhi; and what appeared to be quite an efficient collective farm about thirty miles outside Moscow, with Friesian cows and Large White pigs.

Any conclusions? No, only impressions, of which perhaps the most important is that the ordinary Russian is naturally a friendly fellow. This may have no effect on the course of history—but it might.

## CONFESSIONS OF AN INVENTOR

*The Emsley Lecture to the Textile Institute in Manchester was given this autumn by Mr. J. R. Whinfield, inventor of 'Terylene' and a member of 'Terylene' Council. The title of his lecture was "Textiles and the Inventive Spirit." Towards the end Mr. Whinfield gave the following account of how he came to discover 'Terylene.'*

IN 1935 Carothers, then a research chemist working for Du Pont in America, had already discovered nylon, but the work of exploiting this discovery had not been accomplished, perhaps scarcely begun. It was in that year that I began to turn over in my mind the idea of evolving a true synthetic fibre. I was greatly encouraged by the work of Carothers, but was very uncertain whether the discovery of a true synthetic fibre would be capable of exploitation, as I imagine were a good many other people at that time. By 1939 it had become apparent that we were wrong in entertaining these doubts, for in that year nylon made its first appearance as an article of commerce.

It is an interesting fact that once an invention in some particular field has been worked out, interest in the actual region of invention sometimes tends to cool off. It has already been the subject of tremendous effort. The crop has been harvested, and perhaps people think that the region has nothing more to yield.

I have no doubt that in many instances they are right and that much time is often wasted in tilling unprofitable land. But in this particular instance I could not bring myself to believe that the region was exhausted, and eventually I was able to generate some ideas concerned

with such questions as molecular symmetry and rigidity, all of which seemed to have a bearing on problems of fibre structure. Gradually these ideas formed themselves into a definite pattern of thought which could perhaps be translated into a physical reality—and what is more, translated with the resources that were available to us. In this we were especially fortunate: test-tubes and the like—the conventional paraphernalia of the ordinary chemical laboratory—were our natural habitat.

And so, at the last, everything came to depend on the result of one crucial experiment. In essence that experiment consisted in heating together two chemical substances, one of which was the familiar ethylene glycol and the other the very much less familiar and long-neglected terephthalic acid. This was the actual inventive step, but it was of course a step into the unknown.

I will not attempt to analyse the chances, as they appeared at the time, of that step landing us on firm ground. I think we would have put them at about even. However, when the experiment was finished we were left with the physical reality of a few crude but obviously tough fibres which did not melt below 250° C.—and that is how 'Terylene' began.

### I.C.I.'S NEW TITANIUM PROCESS—I (continued from page 5)

had never been experienced on the smaller scales. In these cases the reaction stopped before it was complete, and sometimes no amount of coaxing or kicking could get it started again. After a prolonged series of experiments, methods of control were worked out which did not arouse such obstinacy, and this aspect no longer occasions any worry.

Then the separation process refused to respond to treatment, and in the end it was decided that the method employed was fundamentally unsuitable and would have to be replaced by a more appropriate one. By this time the design of the Wilton plant had been carried to an advanced stage by Chief Engineer's Department. Further design work on this part of the plant was suspended for several months while Research Department constructed and tested the chosen alternative. When the new design was finally approved, the design engineers had to set to work with redoubled energy, throwing out the old design, preparing the new, and even altering the design of buildings to fit the revised scheme.

That the design and construction of the plant went forward to schedule in spite of many difficulties speaks volumes for the organisation and industry of the design engineers. Besides a number of major alterations, they had to cope with several minor changes of mind by Research Department, arising legitimately from continuing research experience. The natural reaction of an engineer after laboriously designing and half making a piece of plant which a chemist then wants to throw out is to make forceful though futile suggestions about where the chemist should spend the rest of his existence; but relations between Research and Chief Engineer's Department remained exceptionally good throughout.

At last the essential parts of the plant were completed according to schedule early in the present year, and they were handed over to the works for starting up. This involved a vast amount of work: first in the training of personnel, a task in which Research Department gave valuable assistance. Then there was the cleaning out of pipes and vessels, and the adjustment of the multitude of instruments which help to control the plant with the minimum of labour. Auxiliary pieces of plant had to be got working before the start of the main process, and the gremlins which inhabit every new plant were finally tracked down and eradicated.

During the construction of the Wilton plant the experimental plant at Widnes worked steadily, both for experimental purposes and for the production of metal. Since then the main experimental preoccupation of the smaller plant has been the further improvement in metal quality. Although quality satisfied the standard of the time when the Wilton plant was conceived, it was expected that requirements would become more stringent. This has indeed proved to be the case, and the 1953 specifications are now obsolescent. But the efforts of the Research Department have enabled product quality to keep abreast of advancing quality requirements. Their experience has been passed on to the works, so that the Wilton plant is now producing titanium which satisfies present-day standards.

The future for titanium looks bright. The cost of the metal is, however, still too high for many industries which might otherwise use it. The Division is therefore now starting on a programme of work designed to cheapen the process still further, as well as to make more improvements in quality.



# Garden Notes

By Philip Harvey

Illustrated by Susan Einzig

I HAVE yet to meet anyone who dislikes freshly gathered garden peas. There is, however, no denying that they demand extra careful soil preparation and are consequently not a crop for the lazy gardener. Successive sowings at fortnightly intervals from about mid-March to early June are often recommended. (You can, of course, sow earlier than mid-March if the soil is in the right condition.) This may work out in theory, but in practice one can seldom rely on reasonably even growing weather during these three months, and a couple of sowings will often be ready to pick simultaneously. A better plan is to sow again when the previous batch is about an inch high.

The roots of peas can go down as much as 2 ft.—hence the need for deep digging, as with sweet peas. Peas occupy plenty of space—another reason for giving that extra bit of attention to secure the maximum crop. Work in generous supplies of compost with the addition of bonemeal in the top spit. Hop manure and peat are also useful. You must ensure that the soil is retentive of moisture and the roots able to move freely. If the ground has not been dug properly and numerous hard, unbroken lumps remain, you will never get a sound root system and the top growth will be disappointing.

Careful choice of varieties is very important. The tall-growing varieties like *Alderman*, *The Autocrat* and *The Miracle* obviously require more pea-sticks or a bigger area of

netting. They take longer to mature than the dwarf earlies like *Little Marvel* and *Meteor*. Most early peas are, in fact, dwarf and are ready to pick 11–12 weeks after sowing, whereas maincrops may take 14–16 weeks. Remember also that the taller varieties take far more out of the ground: it is absolutely useless attempting to grow them unless you put plenty of “body” into the soil. One pint of peas will sow a row 70 ft. long.

All peas require some form of support, even the very dwarf varieties. For example, *Little Marvel*, though a tremendous cropper with a delicious flavour and only growing 18 in. high, must be supported with twigs, otherwise many of the pods will sprawl on the ground and be consumed by slugs, especially on heavy, damp land. I can strongly recommend this variety, as it is a rapid grower, ready in eleven weeks and with eight peas to the dark green pods, which are produced in pairs. It does very well on light, dry soils.

Last year I tried the new variety *Early Onward*. This is, I am convinced, a pea for every garden. It was excellent on my heavy soil during last year's very dry summer. *Early Onward* is an early, quick-growing variety with the same habit as the well-known *Onward* but is ready at least a week earlier. The blunt-nosed pods are very

freely borne from the top to the bottom of each plant, and I think this novelty is an even heavier cropper than its predecessor. The height is about 2 ft. Most important of all, as I have already mentioned, *Early Onward* is markedly resistant to drought, unlike many culinary peas.

For an extra early sowing say in January try *Laxton's Superb*, which grows to approximately 2½ ft. If you are anxious to grow a tall variety, remember to give the seedlings plenty of water during a dry period and mulch with a 3 in. layer of damp peat. There is nothing to beat *The Miracle*; this variety stands up to dry weather better than most peas.

Brassicas all appreciate land on the heavy side and with an alkaline reaction. They are sometimes more successful on allotments than in small gardens, the reason being that they prefer an open position. Cauliflowers and Brussels sprouts must be “done well” as gardeners call it, i.e. the soil must be deeply worked and enriched with plenty of compost.

Among the many varieties of cabbages offered in catalogues, *Winningstadt* is especially good. Sown in early April it can be cut from September to November and is a tight-hearted variety, which means that cabbage caterpillars find it extremely difficult to burrow inside and are the more readily

destroyed by prompt spraying with ‘Sybol.’ *Winningstadt* does well in the north.

*Greyhound* is another excellent cabbage for spring sowing. It is usually ready to cut some weeks ahead of other varieties. A March sowing ensures a good crop of firm heads from the end of June or early July onwards.

Cauliflowers are invariably disappointing on hot, dry soils. They must never be allowed to dry out and are definitely gross feeders. As every gardener knows, they produce only one head or curd, which must be cut and eaten before it goes woolly. Cauliflowers take up a fair amount of space, and if one judged them just on this basis they would undoubtedly be left out of the average vegetable plot.

However, as I emphasised in my December article, gardening is not really a matter of economics. I assume therefore that you are willing to fuss this vegetable, and I suggest any of the following varieties: *All the Year Round*, a short-stemmed variety with a medium-size head which, as the name suggests, can be sown at any time of the year provided the plants are never exposed to frost; *Early Snowball* for sowing in mid-February to head up in late June; and *Veitch's Autumn Giant*, an extra-large cauliflower which is sown in April to mature in October.





# Desert Blooms

By Francis Baranyovits (Hawthorndale Laboratories)

Deserts have a strange fascination. Here on the arid earth under the burning sun plants and flowers seem to grow more strangely beautiful in the struggle for existence. Some, such as the cactus, store water from which to live. Others die back in the drought, only to bloom again in the path of the rush of waters after a cloudburst. Yet others, such as the yucca, seem equally at home on the edge of the desert or in an English garden. Rarely have they been more beautifully photographed.

*Photographs by the author*

**D**ON'T bother about rattlesnakes—they usually rattle before they bite you; but don't touch those desert plants—most of them will sting or cut your fingers." A friend of mine in California gave me this advice while showing me his photographs of the desert. Of these one of the saquaro cactus "forest" in Arizona revealed the strangest landscape: huge erect columns dispersed over the rocky soil with arms raised towards the sky.

One giant cactus was over 50 ft. high and had 52 "arms." It is believed to be about 250 years old and to weigh thirteen tons! It is hard to imagine how nearly twelve tons of water can be stored in this plant under the hottest sun, and on the driest of soils, where the rainfall is minute. Thanks to their water-storing ability and their thick cuticle, the cacti are able to survive the climate of the desert. But cacti are not the only blooms in the desert. Quite a few other plants manage to live there without this capacity to store water. How? It seems mysterious.

Americans are not only friendly, but in their very sincere hospitality they try to read your wishes. It so happened that at week-ends I was invited to see their lovely mountains and lonely deserts. California claims to have both the highest mountain and the lowest depression in the United States. I did not climb Mt. Whitney (14,496 ft.) but walked on the concrete-like shore of the Salton Sea, some 250 ft. below sea level.

In May I was invited to see the field trials of the University of California at Blythe and Imperial Valley. The way from Riverside passed Salton Sea and Desert Center, and I had the chance to see a bit of Arizona while travelling down to Yuma. It was my most interesting excursion, thanks to a very patient friend who stopped several times to show me interesting plants I had never seen before. To my great surprise I found some beautiful shapes and lovely blossoms. Are they the result of the struggle for life?



SMOKE TREES on the shores of the Salton Sea in California. Seen from a distance, these trees look like smoke trails and in reality have a bluish tinge.

As we approached the Salton Sea in the early morning I noticed some delicate bluish-grey shrubs on pale yellow sands. The whole scene was like a fine pastel picture. "These are the smoke trees," my friend explained. Indeed, they appeared as tiny smoke clouds trailing over the desert sands. These spiny, almost leafless shrubs are very beautiful in June, when they are covered with bluish-violet blossom. They grow only in sandy wastes, in the path of the rush of waters, which only occurs after a cloudburst.

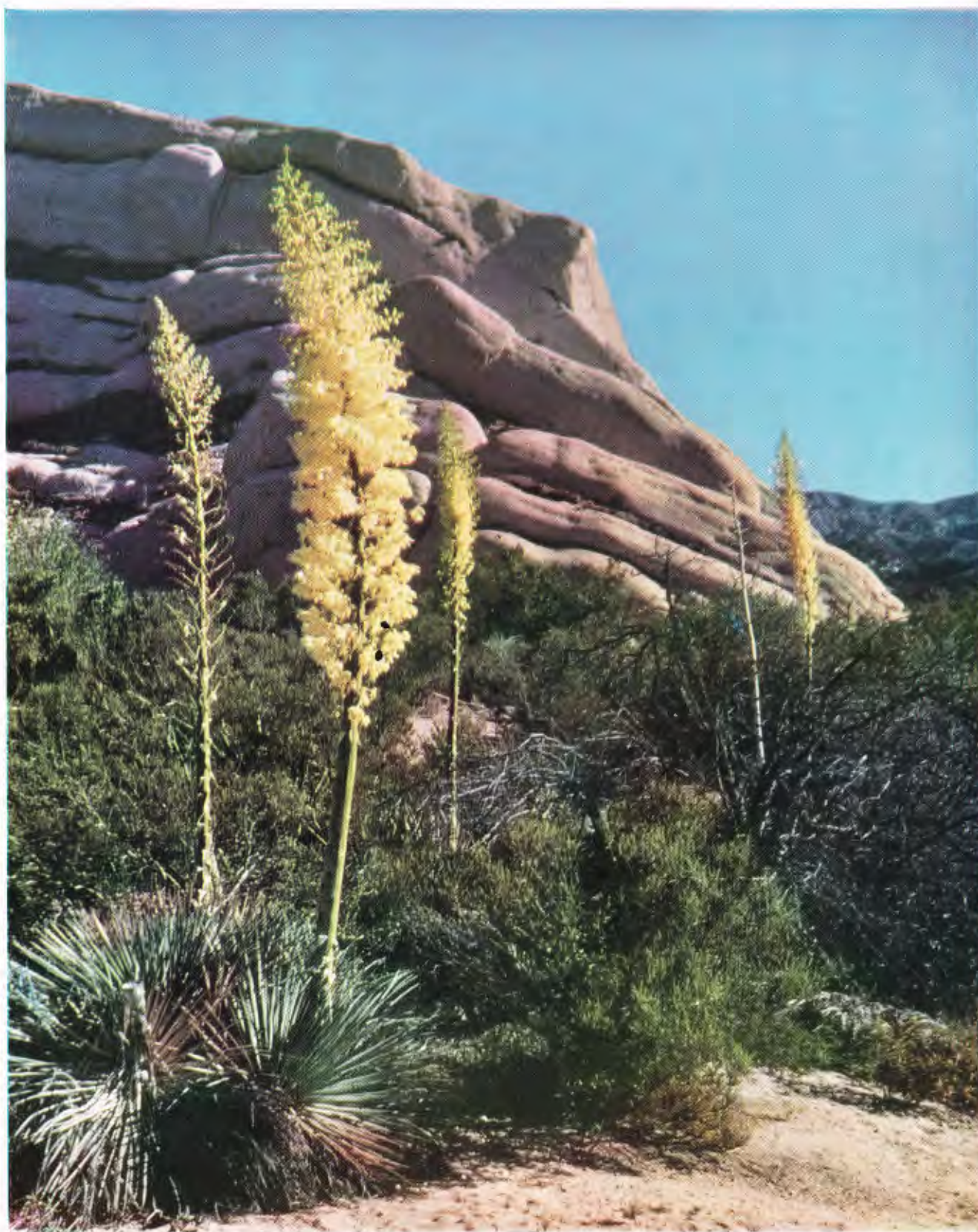
Later, further out in the desert, I found one of the oddest of the desert shrubs, the ocotillo. If it had not had blossom on it we would not have noticed it. The large, deep red flowers on the very tips of the long and spiky stalks appeared strange but beautiful against the deep blue sky.

This shrub loses its leaves in the drought, but every time it rains in the summer a new set of leaves grows. Thus there may be several crops of leaves in one year.

I was unlucky when taking photographs, as there were no leaves on the ocotillo just then. I was also disappointed to find no flowers on the saquaro cactus. Nevertheless I was very much impressed by the shape and size of this tall cactus. When standing a few feet away from it I felt rather small looking at that huge fleshy column. I was told that the Indians used to gather and dry the fruit of this cactus. It is very palatable and resembles dried figs. The saquaro harvest—in July—marks the beginning of the year for the Pima Indians, and it used to be celebrated with games and feasts.

The most impressive bloom I photographed in the





YUCCA PLANT IN FLOWER near the Mojave Desert in California. These blooms, known as candles, rise to a height of 16 ft.

desert was the "candle" of the yucca. Hundreds of creamy-white bells hang closely arranged on the upper part of its very long stalk. When one sees the small yucca plant, with its thin, stiff, spearlike leaves, it seems extravagant for it to grow a 16 ft. long stalk to carry its blossom. The yucca, however, is not a real desert plant, as it grows on the slopes of the hills on the edge of the deserts. I took my photograph of the yucca in flower near to the Mojave Desert in a valley where I saw those very odd-looking Joshua trees growing.

No one would call these Joshua trees pretty or their blossoms attractive. But one still has to admire them because of their strange shape. The Joshua tree, with its short, stiff, prickly leaves, looks rather like a shaggy cactus, but it belongs to the lily family (Yucca species). The area on which one finds these rapidly diminishing trees (some 100,000 acres) is now protected as the Joshua Tree National Monument.

The Mojave Indians—as the saga was told to me—who hunted this area many years ago, used to select a Joshua tree as their own "life tree." When an Indian died, his relatives or friends set fire to his tree. The rising smoke was to follow him to the "Happy Hunting Ground" and was a cloud to protect him from the hot sunshine of the desert.

Having experienced the sunshine there, I could appreciate very much this ancient Indian rite. Even nowadays you can find a few black charred trees.

I walked a lot on the hills among rocks and across desert sands and managed to take quite a few photographs and was stung by different species of cacti and by plants I could not name, but I did not see any rattlesnakes and did not hear them rattling either. The only person who seemed to be disappointed about it was Oscar, a nice guy at the University



THE SAQUARO CACTUS in Arizona. This cactus is about 30 ft. tall, but some plants grow to 50 ft.

campus. He is a very good naturalist and told me how to catch rattlesnakes.

"It is a simple matter," he said, "to catch it with a forked stick, put it in a bag and bring it home alive. Then I shall roast it, and you will see how delicious it is with pickled onions or pineapple." I agreed with him at first, so convincing was he. Next day, however, I changed my mind and hoped very much not to meet any Californian snakes. I have still to taste that very special dish of the South.



# Cyclist of the 'Nineties

By Ernie Wright (formerly of Paints Division)

An 83-year-old Paints Division pensioner recalls in an interview the days of pennyfarthings and bloomer girls.

WHEN the first lady bicyclists were pedalling daintily round Hyde Park, evoking, with their bloomers, cries of "Got yer father's trousers on?" from the butcher boys, Ernie Wright was a boy of 16 learning to ride his first pennyfarthing. The machine cost £12, of which his father, a C.I.D. sergeant, sportingly paid half.

The front wheel was 54 in. high and the saddle a little higher than that. It was a long way to fall, said Ernie, who has more scars than a Peninsular War veteran and a tale for every one of them. It was also a long way to mount. The bicyclist held the handlebars and straddled the little back wheel, on which there was a step. He put his left foot on the step, gave a couple of hops, and then (Ernie seemed to quote from a textbook of the 'nineties) "vaulted lightly into the saddle." Racing machines, with front wheels up to six inches higher, were a slightly stiffer proposition, and sometimes the rider needed the support of a lamp post before he could mount.

Ernie lived in Paddington, which seems to have been a keen place for bicyclists. The Paddington race track was one of many in London, and there such great exponents as Harvey du Cros performed. It was at Paddington that Ernie saw McReady, who rode for Dublin University, speed past the solid-tyre



THE SIDE-BY-SIDE TANDEM or "sociable tricycle," in vogue in the 1880s

machines on a pair of the first pneumatics.

Solid tyres and the London wood-block roads were a skid-provoking combination. Ernie remembers some "awful spills" from his high perch, and one in particular when he landed underneath an ice-cream cart in Hammersmith Broadway. The traffic was a curious combination in the 'nineties: horse omnibuses, "growlers" and steam cars, with bicycles dodging in and out between them. Cabbies held the steam cars in high disregard and exercised their Cockney wit on the drivers. Ernie tells of one occasion when—after a traffic halt—a

steam car stalled and then started off again with a great burst of steam. Faithfully conjuring up the Cockney intonation of sixty years ago, Ernie went on: "The cabby behind the steam car stood up and yelled 'Get a move on—you and yer scratch corfee shop!'"

Mr. Wright senior was what Ernie describes as a Roman father. One of his sternest whims was that his sons should be prompt for their Sunday dinner. This led Ernie and a friend to clock some remarkable times on their Sunday morning jaunts. They would speed out to St. Albans or Luton and be back at Paddington in time for their dinner at 1.30. If they were late and pleaded a mechanical breakdown, father would inspect the bicycles to see if the spanner had been on the alleged defective nut.





# I.C.I. NEWS

## PROFIT SHARING TRUSTEES AT STOCK EXCHANGE

THE chairman, secretary and four trustees of the I.C.I. Employees' Profit Sharing Scheme questioned the chairman of the London Stock Exchange, Sir John Braithwaite, and his deputy for an hour one afternoon recently on the whys and wherefores of the stock market. And they all smiled broadly when Sir John, to the question "What is the best stock to hold in times of inflation?", replied "I.C.I."

The meeting took place when the chairman of the

which houses the broker's dealing staff, their nine telephones, and a blackboard on which current prices are marked.

"The stock market is like any other market," the I.C.I. visitors were told by Mr. A. F. B. Cooke, secretary of the Stock Exchange Share and Loan Department. "But instead of having stallholders who sell apples you have jobbers who deal in one particular kind of share, and their customers are brokers, acting for clients." The virtue of the stock market, said Mr. Cooke, was that you could buy or sell a share at any time at a price that was published for all to see.

Then came the questions to Sir John Braithwaite. Mr. Yarwood, who works in the blacksmith's shop at the Avenue Works of Alkali Division, wanted to know how he could buy or sell shares when there was no broker in Northwich. "Go to a bank or a solicitor," was Sir John's advice. "When we get our shares," asked Mr. Pirie of General Chemicals Technical Service Department, "should we hang on to them?" Sir John told him bluntly that "Chemicals" (the Stock Exchange name for I.C.I. shares) were one of the finest investments in the country.

There was some discussion as to whether employees would in fact part with their shares as soon as they got



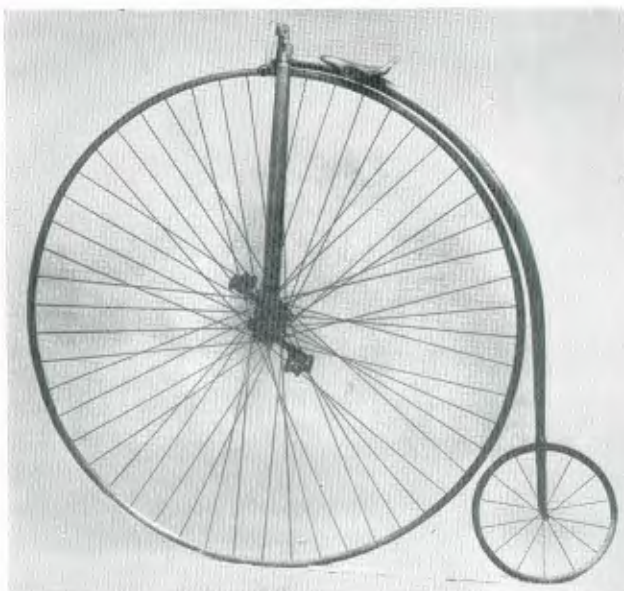
Mr. George Winspear of Billingham Division meets Sir John Braithwaite

trustees, Mr. F. Hill, took his colleagues to see how the Stock Exchange works. "We are very pleased indeed to see you," Sir John told trustees George Winspear (Billingham), Harry Yarwood (Alkali), Norman Grundy (Dye-stuffs) and Harold Pirie (General Chemicals). "The more people who come to see us, the better."

Before meeting Sir John the trustees visited the public gallery of the Stock Exchange and looked down on members transacting business on the floor of the house. Under the benign guidance of 70-year-old Mr. Kit Hoare, I.C.I.'s principal broker, they even ventured a few feet on to the floor themselves without paying the customary penalty. Mr. Hoare showed them the shoe-box-size office



Mr. F. Hill (centre), Chairman of the Trustees, introduces Mr. H. Yarwood of Alkali Division (right) to Mr. A. F. B. Cooke of the Stock Exchange



THE PENNYFARTHING. This model is the standard Rudge bicycle of 1884, weighing 21½ lb.

Ernie kept the pennyfarthing for three or four years and then bought a Kangaroo—a machine with two chains and a 44 in. wheel. After that he owned a Facile, which was geared 70 : 1 and propelled by pressing the pedals up and down. Then came his first Safety machine. One way or another, he told me, he had ridden every kind of machine there had ever been, including triplets and quadruplets.

All these bicycles were hand made by small makers. "They were the cream of the makers, the small men," said Ernie, "and if it comes to that they still are." His favourite maker was M. G. Selbach, who once built him a 47 lb. tandem. "We could shift on that machine, the wife and I—she was as light as a feather in those days."

It would be picturesque to think that Ernie courted Mrs. Wright on a Sociable, on which the riders sat side by side. Actually he never persuaded her to mount a bicycle until after they were married, and then she was as nervous as a kitten. He left it to be tacitly understood, however, that he courted and wed her because her extreme lightness complemented that of Selbach's tandem.

In those early days of bicycling, racing was taken with commendable seriousness. Ernie gave me one instance of the emotion engendered at the racing tracks. He and his friend were cycling through Richmond Park one day, Ernie on a 56 in. Invincible. A man on a 58 in. Farringdon Rational rode up (he later turned out to be George Lacey Hillier, editor



THE KANGAROO, an early example of gear drive, patented by W. Hillman in 1884 and weighing 48 lb.

of *Bicycling News*) and said: "Hello boys, going in for racing?" Then he took a closer look at Ernie's friend's machine. "Good heavens!" he said. "I know that machine—it belonged to my friend Herbert Cortis, and it was in the riot at Lillie Bridge!"

Ernie asked me if I knew about the riot at Lillie Bridge, and when I said I did not he recalled it with relish for my benefit. "That was quite an event. Lillie Bridge was a racing track out Brixton way. One day the judge gave a decision the crowd thought unfair. So they sacked the grandstand and burnt it to the ground. People," he added, "were much keener in those days."

In their younger days Ernie and his wife saw most of the beauty spots of England from their tandem. Ernie would come off night shift at the Stowmarket paint factory (where he had gone to work when he was about 35), and off they would go at once for a spin. On holiday they would go to Blackpool, the Wye Valley, Evesham, Southsea or Bristol. At 83 years of age he still rides and is vice-president and a life member of the Ipswich Cycling Club. "Mind you, I'm a bit like a Russian pony now," he says; "I go a little way in a long while." Staidly he pedals through Stowmarket on an upright machine made from the components of various machines he has owned. He showed it to me in the garden shed and affectionately flexed the saddle. "Feel that—isn't it as supple as anything? Thirty years old, that saddle is."

M.J.D.



them. "I don't think so," was the opinion of Mr. Winspear, a shotfirer in the Billingham anhydrite mine. "The younger man looks on this scheme as a second pension fund."

Then there was a word of warning about "sharks." "How do you guard against them? By never selling your shares at a price much different from market prices quoted in the daily newspapers," said Sir John. "In any case you should never sell through anyone other than a broker, a solicitor or a bank."

Mr. Winspear asked if the Stock Exchange had any influence on a company's prosperity, which drew from Sir John the reply that on the contrary the stock market was only the barometer of prosperity or lack of prosperity in a company.

With memories, perhaps, of the price reached by I.C.I. shares just before the Company's last annual general meeting, Mr. Grundy, a foreman at Huddersfield Works, asked why the price of shares went up and down. It was chiefly a question of supply and demand, Sir John answered; the last big rise in "Chemicals" had been put down to heavy American buying, but there were all sorts of other things to take into account, the market being full of unpredictable currents and eddies.

There were other questions: Would I.C.I. have grown to its present stature without the help of the Stock Exchange? If the Company wanted £10m. capital, would the Stock Exchange find it? Why does a £1 share usually cost more than £1? They all got an answer, and there would have been more questions but for the fact that you cannot detain the chairman of the Stock Exchange indefinitely. The interrogation ended with the trustees declaring that this had been a memorable afternoon and Sir John declaring that he hoped it would soon be repeated.

## CHIPMAN LTD.

I.C.I. and Plant Protection interests in the crop protection field in Canada are now represented by Chipman Ltd., a Canadian company of which the whole share capital is held in equal proportions by Canadian Industries (1954) Ltd. and Chipman Chemical Company Inc. of New Jersey, who are already associated with Plant Protection's business in the U.S.A.



Mr. C. T. Ward

The present headquarters of Chipman Ltd. are in Montreal, but it is intended that they shall eventually be located in Hamilton, Ontario, the geographic centre of one of the largest agricultural areas in Canada and where part of the company's formulation work will be carried out. Mr. C. T.

Ward, a joint managing director of Plant Protection Ltd., will have a seat on the board of the new company.

## UNIVERSITY AND SCHOOL LIAISON

A schools and a universities liaison officer have recently been appointed to Central Staff Department. They are Mr. E. A. Cooke (universities) and Mr. J. R. Allen (schools), and their work will be to pave the way for closer co-operation on research projects between industry and the universities and to aid the recruitment of the right type of man or boy into the chemical industry.

Mr. Cooke, who was staff manager at Alkali Division, was educated at Merchant Taylor's School and St. John's College, Oxford. He joined the research department of Brunner, Mond & Co. in 1922 and in due course became deputy research manager. He was appointed staff manager in 1946.

Mr. Allen had been manager of Lostock Works for 21 years at the time of his new appointment. After taking his engineering degree at Cambridge he began his career in the Brunner Mond drawing office, and there acquired a basic knowledge of ammonia soda design. In 1933 he became chief maintenance engineer at Winnington. He has been chairman of the Alkali Division apprentices selection committee since its inception in 1948.



Mr. E. A. Cooke



Mr. J. R. Allen

## BILLINGHAM DIVISION

### Awards for Coolness after Explosion

A chargehand and fourteen processmen have received meritorious service awards and letters of thanks from the Division chairman for the part they played after the explosion in the Ammonia Works low-pressure compression plant on 22nd September. (The award of the I.C.I. Bravery Medal to Mr. John Steward was reported in the December *Magazine*, and a picture of Mr. Steward appears on page 27 of this issue.)

The chargehand and processmen were working in an adjacent building which houses the intermediate and high-pressure compression plants when the explosion occurred.

In his letter Mr. W. J. V. Ward thanked them for the way they had stood by their jobs and shut down the plants in good order, although they did not know just what had happened in the low-pressure plant.

The chargehand is Mr. J. G. Moss, one of three brothers in Ammonia Works, and the processmen are Messrs. T. S. Stephenson, W. Gregg, D. T. Hart, E. Parkin, W. A. Piterlin, C. Willis, W. Fraser, W. Wheeler, J. Hughes, N. Draper, A. W. Mann, W. E. Allanby, J. Peacock and L. O'Hara.

The plant was in production again, on a limited scale, within a few days after the explosion, and full production was resumed in a matter of weeks.

## Major Kenneth Gordon

Major Kenneth Gordon, C.B.E., M.C., joint managing director of Billingham Division from 1936 to 1948 and one of the original members of Wilton Council, died on 29th November after a sudden illness. He was 58.

Major Gordon was appointed Research Manager at Billingham in 1927, soon after joining I.C.I. He was given a seat on the board in 1931 and appointed joint managing director in 1936. He was one of the chief designers of the hydrogenation plant built in 1933, and at the beginning of the second world war he helped to design the aviation gasoline plant at Heysham. He was also responsible for the petroleum chemical plant built at Wilton after the war and for extensions at Billingham.

During the war he became vice-chairman of the diffusion committee of Tube Alloys, the atomic energy project. He left I.C.I. in 1948 to join Trinidad Leaseholds Ltd., and later he was appointed deputy managing director of Head Wrightson Processes Ltd., but in 1952 he was released by them to become Director-General of Ordnance Factories, the post he held at the time of his death.

Sir Harold Hartley wrote in *The Times*: "Kenneth Gordon's death at the early age of 58 is a great loss to chemical engineering and a sad blow for his many friends. Gordon was always at his best in a major development project, in which his imaginative approach, his technical judgment, and his bold decisions found full scope. On several such occasions he rendered great service in this way—at Billingham, at Heysham, in the early days of atomic energy, and at Wilton. At Heysham, where we had to build a 100-octane aviation fuel plant at top speed, Gordon's drive and initiative were invaluable. It is a sad thought that we have lost his great store of knowledge and experience which we need so badly today, but even worse is the loss of his buoyant personality."

## 'Recruit' among Veterans

Lord Chandos, better known as Mr. Oliver Lyttelton, who since the beginning of last year has been a non-executive director on the Board of I.C.I., presented long

service awards to members of Billingham Division staff at a dinner in November.

In his speech he described as nonsense the belief of some people that it was impossible for a large company not to become impersonal and inhuman in its relation with its employees, and he spoke of the presentation of long service awards as one of the most important events in which a company could engage.

Lord Chandos introduced himself as "a recruit giving away prizes to veterans" and then spoke of his tour of the factory earlier in the day. "I was exhilarated," he said, "by these great installations, and I had the sensation of feeling the Company's pulse beating hard."

"When we look at all the problems, whether they are those of nuclear physics or of raising the resources of the world," Lord Chandos continued, "one of the first things we find to be necessary is the very large company, and ours is one of the very largest. We have nothing to be afraid of about size."

"Companies have to be very large," he said, "if they are to be able to spend money necessary for the research and development to keep them in the forefront of industrial progress. We have to be in the van of industrial progress, for if we are not in the van we shall be in the cart."

## TV for Shiftmen

Television viewers who are also shift workers have far less value out of their sets than people on day work. In fact, when they are on the 2-10 shift they see nothing of the programmes at all.

Mr. Archie Allardyce, Ammonia Works Councillor and T. & G.W.U. shop steward, thought it worth while bringing the matter to the notice of the B.B.C. He wrote them a letter asking if it would be possible to time the programmes so that shift workers could have more viewing time, and this was the reply he received:

"We are very much aware of the problem of shift workers in relation to television programmes and we do try to meet the need as far as we can within our present overall programmes, by giving repeat broadcasts at different times so as to give people an opportunity, if possible, of seeing a programme which they are unable to see at the first performance. We have steadily increased the hours of television broadcasting, and this development will continue within the limits that have been prescribed by the Postmaster-General."

"Morning programmes will come in time, though doubtless they will be on a limited basis, and we cannot at present make any definite statement on that point."

## DYESTUFFS DIVISION

### National Competition Winner

The tracing section of Division Engineering Department have reason to feel very proud of their No. 2, Miss P. M. O'Brien. She has gained the distinction of being





Miss P. M. O'Brien

In the early part of her training she attended and passed the first-year mechanical engineering course at the College of Technology, Manchester. Some years ago she reached the position of second in command of the tracing section, and now in turn she has the responsibility of training today's probationers, of whom this year there are three.

## GENERAL CHEMICALS DIVISION

### Export Sales Talks

Representatives from the principal I.C.I. companies and agencies of Western Europe attended a three-day



Representatives from the West European companies and agencies of I.C.I. examine a display of 'Aerosol' dispensers

conference at General Chemicals Division in November. The purpose of the conference was to review the Division's present business in Western Europe and to discuss how its position in the market could best be consolidated and improved.

The main products the Division sells to Western Europe—particularly 'Alloprene,' 'Cereclor,' chlormethanes, chlorbenzenes, chlorinated solvents, refrigerants and sulphides—were discussed during the first two days. Division representatives gave up-to-the-minute news of

placed first in the National Tracing Competition (senior class) of the Association of Engineering and Shipbuilding Draughtsmen. Her award, a cheque for £5, and her winning entry "suitably annotated" were presented to her at a special dinner at the Kenilworth Hotel, London, on 10th December.

Miss O'Brien, who is 27, joined Division headquarters straight from grammar school as a probationer tracer in September 1944.

production programmes, and the visitors from abroad gave in exchange a detailed picture of the present competitive situation. The last day was spent in the Division's research department at Widnes, the metal degreasing demonstration room at Runcorn, and the 'Arcton' and chlormethanes plants at Rocksavage Works.

### 'Gammexane' Experts go to Fernhurst

Plant Protection Ltd. has now assumed responsibility for the formulation, sale and technical service of 'Gammexane' used in the public health, industrial and domestic fields.

The Division's Pest Control Section, part of the Technical Service Department, has been transferred to the Fernhurst Research Station of Plant Protection—just one more journey in a history that has been full of journeys. The greatest demand for insecticides is from overseas, and the members of the Pest Control Section have done more overseas travelling in the course of their work than any other section of Technical Service Department and probably of the Division. In Africa, India, Malaya, the West Indies, and Central and South America (to name a few countries) they have organised trials against scourges ranging from malarial mosquitoes and triatomid bugs to hide beetles and grain weevils.

'Gammexane' is I.C.I.'s name for benzene hexachloride, which was discovered by Michael Faraday in 1825. It was not until 1942 that it was found, from a sample submitted by General Chemicals to Hawthorndale, that B.H.C. was a potent insecticide. A year later it was discovered that this remarkable and unexpected insecticidal power was associated almost entirely with only one of the four forms, or isomers, of BHC—the gamma isomer.

### Long-Service Choristers

Long service in church choirs, as well as at work, seems to be the rule at Chance and Hunt Works, Oldbury. They can point there to three men whose total service in church choirs is more than 170 years—and who are still carrying on the good work.

Mr. W. Stevens, a pensioner who worked in the Ledger Department at Oldbury for 47½ years, has been a chorister at St. James Church, Rounds Green, for 61 years. He was a Sunday school superintendent for 45 years and a lay reader for 33 years, and has acted as parochial treasurer for more than twenty years. He has been a member of the parochial church council since it was formed and has acted as deputy organist.



Three choristers with more than 170 years' experience between them: Mr. C. Gould, Mr. W. Stevens and Mr. J. Stephens

Another pensioner, Mr. Charles Gould, who had 50 years' service as a fitter with I.C.I., has been a chorister at Holy Trinity Church, Langley, for 65 years. He too has been on his parochial church council since it was formed, and is now acting as caretaker and vergier.

The works cashier, Mr. James Stephens, has sung in the choir of St. Philip's Church, West Bromwich, for 44 years. He has been a churchwarden and a member of the parochial church council for many years.

### Composer wins Trophy

For the second time Mr. Arthur Fletcher (Accounts Dept., Castner-Kellner Works) has won the Ernest A. Ash silver challenge cup for musical composition at Wallasey Music Festival. Mr. Fletcher first won the cup in 1952 with his suite for pianoforte "Impressions of Switzerland," and this year a panel of distinguished adjudicators awarded him the cup for his Sonata Opus 1 in G for pianoforte.

Mr. Fletcher favours the modern idiom in music, and "Impressions of Switzerland" was based on the augmented triad harmony of the whole tone scale. He is now studying with Dr. J. Roland Middleton, organist and choirmaster of Chester Cathedral, and hopes eventually to have some of his music published. But he is taking heed of some advice given him by the late Constant Lambert (who had it from Dr. R. Vaughan Williams): "Don't try to rush into print."

### Diesely Recognised

Railway fans at Widnes received an unexpected treat recently when the new English Electric locomotive *Deltic* appeared on the through goods line, and one of them, Mr. J. L. Mayhook (Division Research Dept.), took this picture.



The *Deltic* locomotive at Widnes

At the moment the *Deltic* is engaged in trial freight runs. When she goes into service with heavy passenger expresses from Liverpool to Euston her clean, streamlined, smokeless form will become a familiar sight on the main line running over Runcorn bridge.

## LIME DIVISION

### Wayside Shrine



Well over 1000 ft. above sea level on Sandy Lane, a rough cart track off Long Hill, Derbyshire, this wayside stone-built shrine stands exposed to the bleak moorland weather. Dedicated to Our Lady of the World, it was built (with the permission of the Peak Park Planning Board) by a member of the Drawing Office staff, Mr. S. B. Foxton. Working in his spare time, he completed the shrine in five weeks.

The task was not without many difficulties, the chief of which was a shortage of water for mixing the concrete. This had to be carried in buckets from a stream about half a mile away.

The shrine is probably the first to be erected on public land since the Reformation. It is built of local sandstone, the picture in the centre being in mosaic surrounded by white marble. The background to the picture is chemical waste, dyed green, and on each side are two pot roses which came from a convent in Lisieux in northern France.

A local gravestone-maker supplied the marble at the foot of the mosaic, and the inscription is in letters of lead. The roof slates seen protruding at each end of the shrine were obtained from an old house in Buxton.

## 'TERYLENE' COUNCIL

### Good Turn for Scouts

'Terylene' conferred an almost unfair advantage on some of the British scouts at the World Jamboree held in late summer in Niagara. During life-saving tests the scouts had to swim in full uniform, and those of them who were wearing an experimental 'Terylene'/cotton uniform found that it remained light in water instead of weighing them down.

The uniforms tested by the scouts were made from a fabric of two-thirds 'Terylene' and one-third cotton, and stood up to life at Niagara so well that Lord Rowallan, the Chief Scout, has now ordered a 'Terylene' uniform for his own use. The scouts found that they could wash their uniforms, dry them overnight and wear them the next morning without ironing. One uniform was laundered in this way six times in a fortnight.



# NEWS IN PICTURES



Stock Exchange Chairman Sir John Braithwaite shares a joke with I.C.I. Profit Sharing Scheme Trustees during their recent fact-finding visit. On Sir John's right is Mr. F. Hill, chairman of the trustees; on his left are Messrs. A. B. Patrick (secretary), H. Pirie (General Chemicals), H. Yarwood (Alkali), G. Winspear (Billingham) and N. Grundy (Dyestuffs). The trustees spent an hour with Sir John, asking questions about shares and the stock market. They had seen from the public gallery business being transacted on the floor of the house and were shown how stockbrokers work. (Story on page 21.)



Bravery Award is pinned on Mr. John Steward of Billingham by Sir Alexander Fleck at November Central Council.

The award was made to Mr. Steward for part he played after serious explosion in Billingham Ammonia Works in September



Battery of eight domestic washing machines, suitably modified, is used at Akers Research Laboratories for the experimental cultivation of antibiotic moulds. The machines provide constant stirring and aeration of the culture solution



Mutual admiration is the order of the day when Miss Cynthia Coates, a 'Terylene' Council secretary, meets members of the Harrogate Fire Brigade. They are admiring her 'Terylene' wool pleated dress, and she is admiring the 'Terylene' fire hose which they are demonstrating to the technical press

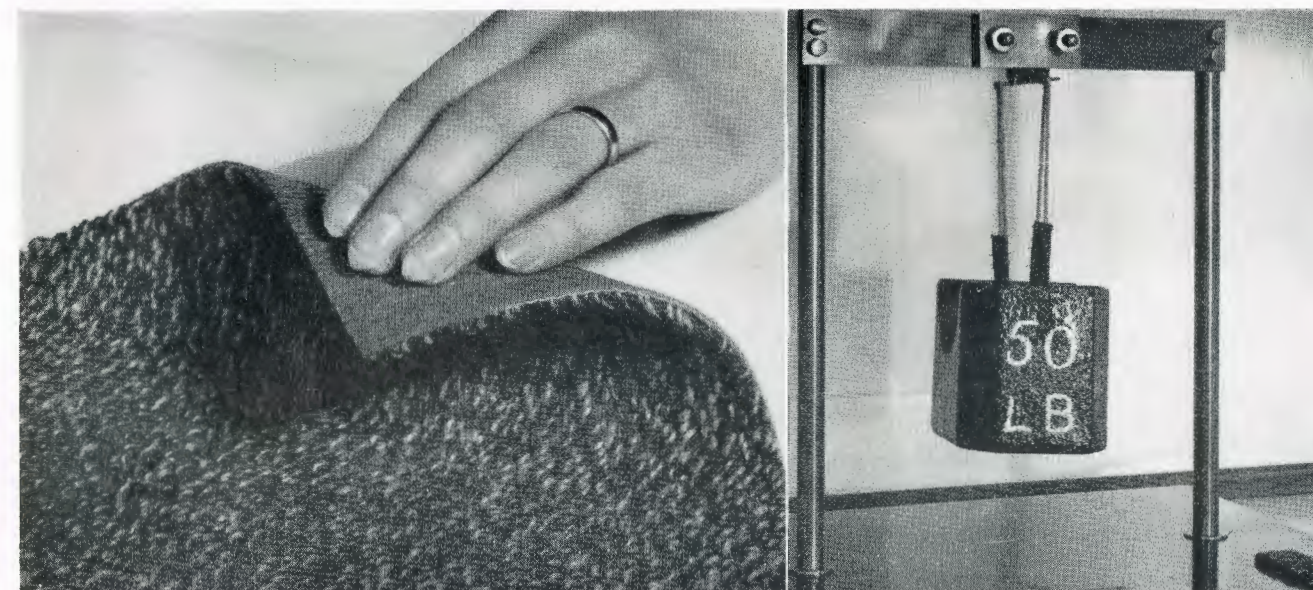




**Presentation by research chemists of Dyestuffs Division** showed their regard for Sir Robert Robinson when after 26 years he relinquished his position as consultant to the Division. Present was set of operatic long-playing gramophone records



**Far from Chelsea.** Two Chelsea pensioners, 78-year-old Sergeant MacDonal and 72-year-old Sapper Padmore, toured Wilton during visit to Tees-side sponsored by R.E. Old Comrades. Mr. R. G. Wallace shows them apprentices' work



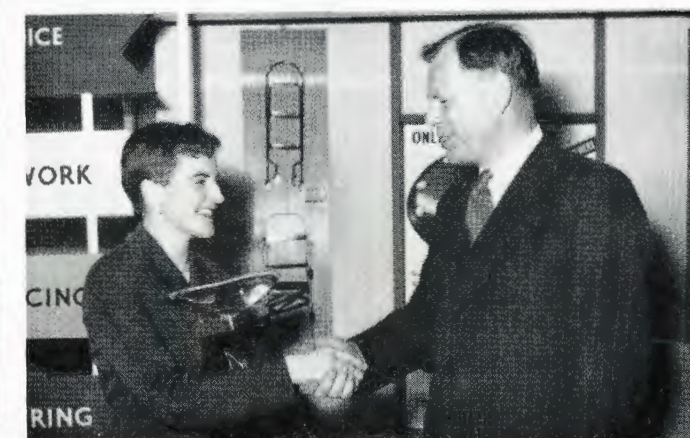
**New carpeting** with a looped pile of 'Ardil' wool or 'Ardil' viscose and 'Welvic' p.v.c. backing will be in shops this year. It is resistant to fire, mildew, moth and beetle, and the makers claim that the loops are so firmly embedded in backing that they cannot be dragged out with pliers. Seven loops support 50 lb. weight (above). Carpet will be available in ten colours



**Outside Buckingham Palace,** Mr. Harry Simpson, Metals Division pensioner, shows wife and daughter M.B.E. awarded him for political and public service in Birmingham. (Photo: Northampton Chronicle and Echo)



**When South African Mr. G. P. Malan** left Billingham, colleagues gave him cast iron cricket balls to take home: larger one is for benefit of short-sighted South African batsmen in next series



**"National Cyclist Union Club Girl of the Year"** was title conferred on 20-year-old Valerie Underhill (Paints Division) when she received Silver Saddle trophy at Earls Court Cycle and Motor Show



# Thin End of the Wedge

By Dorothy Thomas (Metals Division)

Illustrated by Martin Aitchison

WHEN I was fifteen, I was very tall and very thin. Since then, Nature has unkindly added more than twenty years to my age but never an inch to my dimensions.

What is described sometimes as my slimness, sometimes as my skinniness, has been as much of a headache to me as unwanted avoirdupois is to some people I could name. *They* are always in the news. For them fashions in slimming diets are revised with a rapidity not a little suspicious. Dress designers, harness makers and hair stylists join forces in fighting the Battle of the Bulge. Yet no one spares so much as a thought for the minority whose problems, though less weighty, are certainly no easier to solve.

Our worries begin early in life. When other adolescents are trying to disguise puppy fat and pimples, we are learning that nothing in the world will disguise nearly six feet of skin and grief—least of all the school uniform to which we stand condemned for several years to come. The unflattering Mr. Searle has wickedly preserved for posterity the vision of a bean-pole in a gym slip. But even he has no idea of the discomfort imposed by blouses which stop short of their intended anchorage and cotton stockings which strain desperately at their moorings. Throughout these unhelpful years we have but one consolation: at least we look no worse than our gangling brothers in their inadequate suits and school caps.

This is not, of course, the only horror which haunts our schooldays. The other is the unwarranted assumption that tall youngsters ("You have such lovely long legs, my dear!") are specially designed to be good at games. To the end of my schooldays the eyes of my house captain uttered the sad reproach "I don't believe you really *try*, Dorothy!"

Then comes the long-awaited day when we can please ourselves how lazy we are and can choose our

own clothes. Of course we have for years been studying the fashion pages, so we know that *we* are the lucky ones, the ideal of Hartnell and Dior, the willowy blessed for whom models are created. But alas, there is severe disillusion in store. Outside the Hartnells and Diors, no dress designer has ever heard of a woman who is at once tall and slim. We can have the extra length, certainly. There are plenty of elegant bell-tents which give us yards of surplus drapery round our middles and shoulder seams to the elbow. Or we can get "slim fittings." Several manufacturers produce dainty garments with 34 in. hips and hand-span waist—garments which would fit us like a dream if we had no legs. There is nothing for it but to resign ourselves to the situation; either we make our own dresses or we fatten up until our vital statistics match those of the bell-tents.

The latter alternative appeals strongly, and the only snag is that we cannot do it. We have enormous appetites already. Every food provider, from mother to the waiter who has never set eyes on us before, sees to it that our plates groan with nourishment. We do not complain. We adore fried foods, rich puddings and the fanciest of cakes; we can and do eat butter by the slab and cream by the spoonful; we spend extravagantly on candies and chocolates. But all to no avail.

From time to time it has been suggested to me that more rest ("*less tearing about*") would do the trick. This idea never proved practicable until a year ago, when I was forced to give it a trial. For nearly a month I was, in more ways than one, tied by the leg to a hospital bed; for a further two months I lounged with my feet up; and for twice as long I crawled about at a snail's pace, subsiding on to chair or bed at the least provocation. When at last I had an opportunity to weigh myself the excitement was tense. Had it



worked? Well—yes and no. Certainly I was four pounds heavier than last time. Unfortunately they were exactly the same four pounds that had seeped away in the effortful days before "me operation."

Consider, you who are well insulated, how very cold it is to be thin. I know, of course, that we can put on several layers of padding before our figures cause comment. But nothing can really replace the "extra pullovers under the skin" worn by Mr. A. S. Irvine and his kind. The faintest puff of wind strikes straight to our very marrow; frost and snow, unhampered by barriers of flesh or fat, seize relentlessly on our frail circulation. Small wonder, then, that others must be weak with heatstroke before we discard our woolly vests; that "summer" to us means the odd day or two when we can manage with one hot water bottle instead of two.

Spare a thought, too, for the burden of pain we must bear. *We* know exactly what the psalmist meant by "I may tell all my bones," for we have no natural

cushions to protect us. A hard chair, a speck of gravel in the shoe or a ruckle in the bedclothes are to us not minor irritations but insupportable agonies; even an over-hearty handshake is scarcely to be tolerated. And if our bones, as well as being more sensitive than other people's, are also an inch or two longer, so much the worse, for then cramp is added to our surfeit of bruises and abrasions.

Our ultimate torture, perhaps, is a long journey in a crowded train, where there is too little room for our arms and legs and where prancing springs prod us at all points of the compass. How we wish, then, that we had the irresistible bulk of the man in the corner, the smothering spread of the lady who says cosily "Good job you're thin!"

But we would not mind the cold, we could put up with the pain, if only they were not accompanied by the rude jibes of our fellow men. Here is a mystery I shall never understand. No one would dream of remarking flatly to a 15-stone acquaintance "Aren't you fat!" Yet apparently it is perfectly all right for relations, friends and even total strangers to comment "Aren't you thin!"

Affronts of this nature are, I suppose, only to be expected in childhood, when even dumplings are not immune from personal remarks. But why should excruciating humour of the "come-out-from-behind-that-lamp-post" variety be allowed to extend into adolescence and beyond? My favourite enemies are those who cloak their insults in overtones of mock sympathy. "It must be boring always having to wear low heels" (i.e. "*your feet look bigger than ever in those boots*") or "of course, the A-line wouldn't suit you, would it?" ("*you must have bought that thing years ago*").

Tall-thins, cannot we do something about this? Is there no justice in a world which devotes expensive research and even more expensive advertising to thinning down the fat and totally ignores the possibility of fattening up the thin? Why should *they* be able to solve their problem merely by will power and worry when *we* know that worry will only aggravate ours? Above all, why should *they* get away with pointed references to "lean and hungry looks" and audacious lies like "nobody loves a fat girl" while *we* maintain a ladylike reticence?

It is not good enough. We must turn, my dear worms. We must turn!





*Manx Fishermen, Port St. Mary*

*Photo by Miss L. Williams (Safety Dept., I.C. House)*